

1 would be able to in fact coexist with one another.

2

3 So I think on that first level you can
4 look at it in a very broad sense of class
5 compatibility if you will. When you have to get
6 down to protecting existing systems, and that
7 should be the obligation of the Commission of
8 making a determination as to whether to allocate
9 spectrum to something else is what is the impact
10 going to be on existing licensees in that frequency
11 band regardless of how they were licensed. You
12 start to become more focused in the challenge. And
13 at that point, you do have to get into questions of
14 specific compatibility and more detail.

15 I think you used the descriptive term
16 that there's a criticism that the Commission's
17 processes or allocation in the assignment processes
18 are too ad hoc. And I don't think that that's the
19 case. I think they are necessarily ad hoc because
20 each sharing scenario that's being considered is
21 different from the one before it and it's very
22 difficult, if not impossible, to generalize the

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1 results of one particular inquiry to others.

2 MR. STANLEY: Ad hoc is not necessarily
3 a negative term. Correct?

4 MR. BARUCH: Not in my view. I think
5 the more detail you get into, the more complicated
6 the sharing, once you've made the general
7 compatibility determination, the more ad hoc it's
8 going to be. I think there's a couple of examples
9 that I could point to. One of fairly recent
10 origin, which is the Commission's decision to
11 authorize the use of
12 non-geostationary satellites in the Ku band. That
13 was a very difficult situation because there's
14 millions of users of geostationary Ku band
15 satellite services, FSS and DBS services. And
16 those had to be very carefully considered, but that
17 was one. The allocation was made. The assignments
18 were made. And here, what you're left with is
19 something that's not really translatable to other
20 sharing examples that the Commission is going to
21 consider.

22 But it was the right approach to take

1 in that particular case. There are numerous others
2 where that level of detail is there, and I'll end
3 this introductory answer by just saying that as
4 time goes on, there's very little virgin spectrums.

5 So every time you're going to get into a case of
6 considering an overlay of another service, you're
7 going to have to get into these types of difficult
8 issues, difficult compatibility determinations.

9 MR. STANLEY: Mark, is it the
10 definition or the process, if we had to focus to
11 make something better where would we start?

12 MR. CROSBY: Well, I agree with a lot
13 of what Steve said. I guess ad hoc is a good term.

14 But every allocation is different. And every
15 technology that may go in there is a little
16 different. So there isn't necessarily one set of
17 rules that I think you can apply ubiquitously
18 across all your allocation decisions. And I think
19 you have to somewhat careful if the Commission were
20 to skew it's process to try to identify and adopt
21 technical rules to the ninth degree to try to
22 identify and come up with the procedures or

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1 mechanisms to protect interference. You could
2 probably do that.

3 The downside is that the decision
4 process would take so long that the public doesn't
5 want the spectrum. I mean, there's a limit how far
6 you can probably study this. I think you do the
7 best job you can and I think it's dependent upon
8 the allocation and the only thing I might add, as
9 well, is I think assuming the assignment is done by
10 auctions, the people that are participating in the
11 auctions, you know, they have an obligation too to
12 know what's there and who the incumbents may be and
13 who the adjacent channels -- you can do so much,
14 but they have to do -- the onus on them to look
15 for, to protect it, to look at what the technology
16 they're deploying, to protect
17 -- some of this responsibility rests with them as
18 well, I think.

19 MR. STANLEY: Just proceeding I guess
20 along the lines, another aspect of our decision
21 making is it is fairly prolonged and in detailed
22 although again the ad hoc-ness is what contributes

1 to this.

2 David, from a perspective of a carrier
3 and a operator, to what degree do you see the
4 Commission taking so long to get new ideas to the
5 marketplace and also getting changes made? Is that
6 a problem and should we look at it?

7 MR. HAGEMAN: I'm going to say
8 something and it may surprise a lot of people, but
9 in the rural areas, interference is not much of an
10 issue. Capacity is not much of an issue.

11 We have a completely different
12 perspective of how we look at things than everyone
13 else does. Yes, in some cases we do have
14 interference and there are using the technologies
15 that we deployed and the reasons we put those
16 there. The FCC rules address those adequately.
17 But you know, we've been talking here about lots of
18 different technologies. Lots of different ways of
19 doing things. We have CDMA, GSM, TDMAs, different
20 kinds of modulation rates. QPSK, QAMs. QAM rates
21 are going higher and higher.

22 We're talking about many different

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1 technologies, many different things here. The one
2 size fits all rule can't apply equally to all of
3 those.

4 I agree with what Mark says about we
5 have a lot of different things happening here, and
6 each one of those needs to be looked at differently
7 because the interference that you apply to one
8 technology or one type of thing can't work for all.

9
10 I would think that the Commission
11 should take that into consideration in that, you
12 know, if you pass a standard that says this is
13 going to -- this technology or modulation scheme or
14 particular receiver is going to be reused to
15 provide this particular service, that that gets
16 addressed particularly to what's taking place
17 there.

18 You know, for us, the change in
19 technology is kind of a problem. I've heard some
20 people talk about well, the legacy systems and
21 incumbency systems and the safety people and from a
22 small provider here, we can't afford to change

1 systems every three years.

2 We're caught, right now, look at your
3 computers. You have a computer that's great today
4 but tomorrow it's worthless. And we're starting to
5 see communication systems do that. And we can't
6 afford that. It appears that the large carriers
7 are dictating many of the things either by market
8 or by how they interact with us. If we keep
9 changing technologies to make spectrum more
10 efficient, then you're going to basically regulate
11 or force a lot of the smaller people out of
12 business is what you're going to do. Because a lot
13 of the safety people out there probably have
14 systems that they've been using for many, many,
15 many years. And they may be analog. We're still
16 running analog in cellular. The vast majority of
17 our subscribers are analog.

18 We're faced with if you change
19 technology or force us into another technology,
20 we're going to have to change all that out. The
21 Commission defines some carriers as small carriers
22 are 500,000. How about 6,000? It's really hard to

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1 make a business case for that.

2 MR. STANLEY: Well, the Advanced
3 Technology Panel made it clear that with antenna
4 science running ahead and with space time coding
5 and so on, it's going to be really, really great
6 out there.

7 I guess you're raising the issue as to
8 how that might be paid for and how implemented in a
9 reasonable fashion in places where it's not a
10 pushing, driving force.

11 MR. HAGEMAN: It's actually those types
12 of things today are just not required in a rural
13 environment.

14 MR. STANLEY: Nancy, switching from
15 rural environment, interference in cities is an
16 issue, and the Commission's definitions of
17 interference and its processes over the years have
18 tried to manage this.

19 What's your reaction to what you're
20 hearing here?

21 MS. JESUALE: Well, I think that we've
22 all learned something in the past two years about

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1 the actual sort of tactical on-the-ground results
2 when interference forces an incumbent off the air
3 and when the incumbent happens to be the people
4 that respond to your 911 calls, you know it makes a
5 big splash and it's a big deal.

6 I think that we have to understand, the
7 Commission needs to take a point of view that the
8 real tactical problems of local government, if they
9 are to be the providers of public safety first
10 response services are important. And they're not
11 theoretical. Their experiences are maybe even more
12 important than the theoretical solutions. So I
13 know as we experienced Nextel basically turning our
14 public safety radios into bricks, I had to go talk
15 to the police chief and the OSHA investigators and
16 the mayor and council and explain what we're going
17 to do about it.

18 And I'm sure if we had written you all
19 a letter, you all would have wondered what we were
20 going to do about it too. And I'm still wondering
21 what we're going to do about it. And that's the
22 problem.

1 MR. STANLEY: We have a task force.

2 (Laughter.)

3 MS. JESUALE: So this has been a very
4 real learning experience. And I think what we
5 could do with it is apply it into the future and
6 understand that when we commingle players, and we
7 cause a potential for interference, however remote
8 it may seem, we need to be thoroughly convinced of
9 what the response will be in the worst case
10 scenario. Because the worst case scenario might
11 happen and is happening now, it's happening in
12 almost every city. Every local government is
13 either implementing 800 megahertz trunked radio
14 systems or has implemented them. Portland is sort
15 of odd because we were the very first trunked radio
16 system in the country. So we're a mature system.

17 And it was easier to recognize the
18 effects of interference because we had coverage and
19 it went away as opposed to we convinced people to
20 pay \$20 per year per assessed 100th thousand value
21 of their house and given it to me and I put up the
22 radio system and it doesn't work at all.

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1 So I think we have to really seriously,
2 you know, it could have been field tested. There
3 could have been more than just sort of a
4 theoretical mathematical experience prior to me
5 standing there at the OSHA investigator's office.

6 MR. STANLEY: Right. Thank you. Dick,
7 you've been part of the process that helped write
8 these rules. You sort of, I won't say it guilty as
9 much as the rest of us, but what's your reaction to
10 what you're hearing?

11 MR. SMITH: I think it's a fine system.

12

13 (Laughter.)

14 MR. STANLEY: Not only is it not broke,
15 it's in good shape. How's that?

16 MR. SMITH: Especially when you and I
17 were chief of OET. It's actually great to be back.

18 I haven't been here in about four years and I feel
19 a little bit like the ghost from Christmas past. I
20 promised my wife I wouldn't tell more than two
21 stories of my experience working out in the field,
22 but I have to relate a couple here because thinking

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1 back over the last 40 years, I do come to the table
2 with the realization that interference protection
3 and the whole area of interference in the spectrum
4 management scheme is an extremely important
5 function for government. I don't see anyone else
6 capable, motivated, willing and able to preform
7 that function.

8 If there was ever any justification for
9 a federal communications commission, it probably
10 lies in the area of preventing, resolving radio
11 interference. In my mind, there's probably nothing
12 more basic to the good effective spectrum
13 management scheme than an effected interference
14 prevention and resolution process.

15 I started out at the Commission, this
16 is my first story. I started out at the Commission
17 as a young engineer just out of college. I wasn't
18 always the Bureau Chief. I started in the field,
19 and one day in Los Angeles, I received a phone call
20 from the FAA. They said we have interference to
21 our instrument landing system at LAX and we've had
22 to shut it down. This causes some concern in the

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1 aviation community. So I, with my partner, jump in
2 the car and we roar out with our direction finder,
3 which was at that time not much more than a coat
4 hanger for an antenna.

5 And without boring you with all the
6 details, we very quickly locate the source of this
7 interfering signal and it was coming from a car
8 parked in a parking lot near an office building.
9 And so I stationed my partner there to watch the
10 car and I went into the building and announced who
11 I was and what I was about. And apparently, the
12 subject of this investigation overheard me and my
13 cord and my partner he came dashing out the back
14 door and ran to the car and jerked open the trunk
15 and ripped out a device in which point my partner
16 approached him and asked him what it was he was
17 doing.

18 And the end of the story was that he
19 had for some reason wanted to know the whereabouts
20 of his wife and it was his wife's car. So he had
21 bugged his wife's car with this homemade device and
22 had made a poor selection of frequencies.

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1 (Laughter.)

2 And so we turned him over to other
3 authorities for prosecution. Interference, whether
4 it be by a deliberate act such as this was, or
5 whether it be by some inadvertent or poor design or
6 malfunction of equipment, nevertheless, obviously
7 has great potential devastating consequences in
8 some cases.

9 And I have to tell my other story now.

10
11 Again, as a young engineer, I one day got a call
12 from the Navy and they said we cannot, our pilots
13 who are flying airplanes around the coast of
14 California, cannot use the radios in the planes to
15 monitor their emergency frequency. I think it was
16 243 megahertz. And they had to turn those
17 receivers off because of this tremendous
18 interference. And so I went out and after a period
19 of time, including using helicopters and cars to DF
20 the source of the signal, found it to be garage
21 door receivers. Not the little hand held units,
22 but the receivers were sitting there cooking away

1 waiting for a signal, but emitting signals of their
2 own interfering with the Navy.

3 It was very laborious. The point of
4 the story is it was very laborious to DF each of
5 these individual components. Knock on a door,
6 explain to Harry Homeowner. By the way, one of the
7 doors I knocked on was the door of the actress Ann-
8 Margaret.

9 (Laughter.)

10 I remember the story very fondly. It
11 turned out it was not her garage. There were two
12 garages immediately adjacent and after an on-off
13 test we determined it wasn't her garage door. So
14 we let her off the hook after a long interrogation.

15 (Laughter.)

16 I then went to the neighbor and had
17 them unplug their receiver. Now it becomes very
18 clear after doing several of these it's like
19 sweeping the waves back to the seashore with a
20 broom. This is a never-ending and never completed
21 task. There has to be a better way. And as a
22 result of that case, we embarked on really the

1 first of the so-called part 15 regulations that
2 were designed to put the limits on the equipment at
3 the manufacturing and import level. And I think
4 that's a very basic approach that has served this
5 country well over many years now.

6 If you think about the millions and
7 millions of devices out there, both communication
8 and otherwise that use radio frequencies, the
9 results have been pretty phenomenal that we have
10 not had more serious interference problems than
11 we've had. And I attribute that success primarily
12 to the equipment approval program that the
13 Commission has operated, continues to operate very
14 effectively over the years.

15 As to any final points as to where do
16 we go from here, I tend to agree that the system is
17 not broken in the sense that we sort of have to
18 throw everything aside and start afresh. But I do
19 think there's a lot of nibbling around the edges
20 that can still be done and needs to be done over a
21 period of time. There probably is no complete
22 comprehensive solution, close the case, this job is

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1 done we can go on to something else.

2 It is probably a continuous process
3 that we need to maintain for the long term, ever
4 mindful of what I think is very important, never
5 letting the interference genie out of the bottle.
6 If the interference genie, as I say, gets out of
7 the bottle, it's very difficult to go back and
8 recoup. That probably means that if we have to
9 err, we have to err a little bit on the
10 conservative side. And there will be those who
11 maybe take an objection to that. But I can tell
12 you interference resolution is a very real problem
13 and it's very difficult, it's very time consuming,
14 it's very expensive and if not done well it could
15 lead to dire consequences. And I just say keep at
16 it, keep doing a good job, improve in the margins
17 as well as we can, and I think in the long term it
18 will serve you well.

19 MR. STANLEY: Okay, thank you. John
20 Storch, perspectives from a wireless carrier.

21 MR. STORCH: Thank you, Dr. Stanley,
22 for the opportunity to participate to the

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1 Commission and for facilitating this dialogue. A
2 couple of points, if you allow me the slight
3 deviation and forum from telecommunications to land
4 use, but I appreciate your earlier comment in
5 regards to the FCC not being the developers, not
6 being the designers of the system, but if you will
7 the planning land use owners in this process. And
8 very similar to let of land use, I think there's an
9 element in this that's important upon the
10 incumbents of the band to recognize the land use
11 map ahead and the realization that the piece of
12 land next to them will have the stadium, will have
13 the mall, will have the interstate, and to properly
14 design their property, develop their property to
15 accommodate that in the future.

16 To kind of use an example from the city
17 of Portland, was the coverage that they had there
18 prior to Nextel an opportunity of view before
19 Nextel developed their property that if you will
20 blocked their view. Or was it actually impeding
21 upon their land use? And so a similar analogy I
22 think the development of the processes to deal with

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1 how to manage that.

2 And going to a second point, I think
3 it's important that interference is acknowledged.
4 It's a genie in the bottle. The genie doesn't go
5 away. It needs to be managed in that bottle, it needs
6 to be maintained in that bottle, and I think that's
7 an important point to recognize as we develop these
8 processes that it just -- the reality is that the
9 next piece of property, not all developers are
10 right with the same time. The next piece of
11 property will get developed. And how are we going
12 to manage the traffic flow?

13 How am I going to be able to deal with
14 the fact that I used to be able to make a left hand
15 turn out of my property and now because they had to
16 put in traffic mitigation devices I can now only
17 make a right hand turn out of my property or things
18 of that nature are accommodated.

19 The last point, I think, or
20 perspective, is the geographic management of this
21 if you will from a regulatory FCC perspective.
22 Fundamentally, there are technological differences

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1 between the systems and networks that make them
2 incompatible. But I think inherent in the
3 geographic management of spectrum there's also some
4 inherent -- Washington State, to relate to it
5 directly, we have everything from the CGSAs to the
6 BTAs to the line A that mysteriously cuts through
7 the middle of King County for no other reason than
8 it just happened to be so many kilometers from the
9 Canadian border.

10 And I think, if you will, as further
11 regulation is brought forward, other than just
12 simply adopting maps from the Department of
13 Commerce, if you will, but actually there's enough
14 I think if you will electronic technology out
15 there, there's enough technology is geo-databasing
16 that that sophistication needs to be brought into
17 the spectrum management elements as well.

18 MR. STANLEY: Okay. I hear a lot of
19 I'll say happy customers. There's a spectrum of
20 customers whose happiness is variable. Let me sort
21 of open it to the group here and see if there are
22 other perspectives people would like to mention.

1 One gentleman in the back, wait until the
2 microphone gets to you and if you could identify
3 yourself please? Not yet.

4 MR. STEVENSON: This is very
5 interesting. I was especially struck by the
6 stories of what's happened in Portland and then the
7 stories Richard Smith just told about tracking down
8 interference. I think these are beautiful examples
9 of where it is important that we have ways of
10 making sure that important and critical services,
11 aviation or public safety, will not have problems
12 with interference. I don't think it's a problem of
13 regulatory process, there being something wrong
14 with it.

15 I think both of these cases, both
16 aviation communication and navigation systems and
17 public safety systems are exactly the sorts of
18 systems for which the responsibility for robustness
19 cannot, the need for robustness cannot lean upon
20 regulation. Regulation assumes a willingness to
21 cooperate and follow the law. If we have anybody
22 whose interests are not aligned with that, perhaps

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1 anybody who might wish that either of these systems
2 stopped working they can try to jam.

3 And the fact that these systems are so
4 vulnerable that sort of inadvertent little
5 technical mistakes cause them to fall over I think
6 points to their fragility, and these are exactly
7 the sorts of systems which should be designed for
8 maximum robustment.

9 And there are ways of designing anti-
10 jam systems which the military has understood since
11 World War II actually, when they started using
12 wideband FM.

13 Aviation is very interesting. It's
14 almost the only thing in VHF that's using linear
15 modulation, where the signal to noise ratio shows
16 right in your ears whatever it was in the channel
17 and there's absolutely no processing gain. Even
18 though it's 800 megahertz, the 800 megahertz system
19 is still narrow band FM, a legacy sort of
20 modulation technique and that's exactly the sort of
21 place where a wider band system that offered some
22 processing gain could have provided some robustness

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1 from this sort of problem.

2 MR. STANLEY: Right. Just to comment
3 on, I guess you made several points and I don't
4 know whether people want to respond, but just one
5 comment really. Very dramatic story as to what
6 happened at 800. I hope at some point someone does
7 the history, because much of the problems now to
8 some degree are reinterpretation of what had been
9 done say decades ago, different time, different
10 constraints, different motivation.

11 So it would be interesting to see if
12 that data is available, what were the kinds of
13 factors that made people make those decisions and
14 then how did technology grow, the community grow,
15 what happened to create some of these other later
16 problems. Are there any other comments?

17 MR. CROSBY: I can't resist. I simply
18 can't resist. You'd need a whole another day
19 session on 800 megahertz and how we ended up where
20 we are. And it goes all the way back to Docket
21 18262. No, that was 470 to 512 I think. 18262 is
22 the 800, 900, but I'll check in there. And I don't

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1 want to speak for Nancy, but you know this
2 designing the robustments and the system initially
3 -- that spectrum was zoned for a specific
4 application and I'm going to use an example like
5 the Mall here in Washington, D.C. And somebody
6 mentions, well you can put too bad, didn't design
7 it right, you could put a stadium. I'd like to see
8 somebody try to put a stadium on the mall.

9 The Commission has the responsibility,
10 and public safety and critical infrastructure and
11 other types of things, you know, it's a little
12 different. And how you measure value, what is it a
13 commodity or is it a public safety or public
14 interest type of thing. I mean, even if you're
15 going to rezone it, and the 800 thing developed
16 over two decades. You ought to at least have the
17 incumbents have an opportunity at a rezoning
18 hearing or something to see the potential impact.
19 Is it a stadium? What is it?

20 And so I don't think you can be quite
21 so cavalier with certain types of incumbents about
22 hey, you should have figured two decades ago to

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1 design a robust system to accommodate something you
2 didn't even know was coming in 20 years. I don't
3 think it's fair to those types of applicants to put
4 a guess what, we're putting in a prison, or we're
5 going to put in a stadium. You know, too bad. You
6 should have built a hedge. I don't think that's
7 right.

8 The Commission still has the
9 responsibility to figure out what's going on.

10 MR. STANLEY: Nancy.

11 MR. CROSBY: That's all I have to say.

12 (Laughter.)

13 MR. STANLEY: Comment, please.

14 MS. JESUALE: Well, thank you for your
15 comments. I think that we in the public safety
16 community really feel very strongly that if anybody
17 is going to enter our space, we want to let them
18 in. We want to know they're there. We want to
19 approve that they're there, and maybe we can figure
20 out a way to share. But the problem is it happened
21 the other way where we were overrun and now there's
22 quite a bit of pressure by the new internet to just

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